

(1) Is in the steering-gear compartment; and

(2) Disconnects the system from its power source and from the steering gear that the system serves.

(f) Each motor controller for a steering gear must be in the steering-gear compartment.

(g) A means of starting and stopping each motor for a steering gear must be in the steering-gear compartment.

(h) When the main steering gear is arranged in accordance with § 58.25–10(e), two separate and independent systems for full followup control must be provided in the pilothouse; except that—

(1) The steering wheel or lever need not be duplicated; and

(2) If the system consists of a hydraulic telemotor, no second separate and independent system need be provided other than on each tank vessel subject to § 58.25–85.

(i) When only the main steering gear is power-driven, two separate and independent systems for full followup control must be provided in the pilothouse; except that the steering wheel or lever need not be duplicated.

(j) When the auxiliary steering gear is power-driven, a control system for the auxiliary steering gear must be provided in the pilothouse that is separate and independent from the control system for the main steering gear; except that the steering wheel or lever need not be duplicated.

(k) On a vessel of 500 gross tons or above, each main steering gear and auxiliary steering gear must be arranged so that its power unit or units are operable by controls from the steering-gear compartment. These controls must not be rendered inoperable by failure of the controls in the pilothouse.

§ 58.25–75 Materials.

(a) Materials used for the mechanical or hydraulic transmission of power to the rudder stock must have an elongation of at least 15% in 5 centimeters (2 inches); otherwise, components used for this purpose must be shock-tested in accordance with subpart 58.30 of this part.

(b) No materials with low melting-points, including such materials as alu-

minum and nonmetallic seals, may be used in control systems for steering gear or in power actuating systems unless—

(1) The materials are within a compartment having little or no risk of fire;

(2) Because of redundancy in the system, damage by fire to any component would not prevent immediate restoration of steering capability; or

(3) The materials are within a steering-gear power actuating system.

§ 58.25–80 Automatic pilots and ancillary steering gear.

(a) Automatic pilots and ancillary steering gear, and steering-gear control systems, must be arranged to allow immediate resumption of manual operation of the steering-gear control system required in the pilothouse. A switch must be provided, at the primary steering position in the pilothouse, to completely disconnect the automatic equipment from the steering-gear controls.

(b) Automatic pilots and ancillary steering gear must be arranged so that no single failure affects proper operation and independence of the main or auxiliary steering gear, required controls, rudder-angle indicators, or steering-failure alarm.

§ 58.25–85 Special requirements for tank vessels.

(a) Each tank vessel must meet the applicable requirements of §§ 58.25–1 through 58.25–80.

(b) On each tank vessel of 10,000 gross tons or over, the main steering gear must comprise two or more identical power units that comply with § 58.25–10(e)(2).

(c) Each tank vessel of 10,000 gross tons or over constructed on or after September 1, 1984, must comply with the following:

(1) The main steering gear must be arranged so that, in case of loss of steering capability due to a single failure in any part of the power actuating system of the main steering gear, excluding seizure of a rudder actuator or failure of the tiller, quadrant, or components serving the same purpose, steering capability can be regained not

more than 45 seconds after the loss of one power actuating system.

(2) The main steering gear must include either—

(i) Two separate and independent power actuating systems, complying with § 58.25–10(b)(2); or

(ii) At least two identical hydraulic-power actuating systems, which, acting simultaneously in normal operation, must comply with § 58.25–10(b)(2). (When they must so comply, these systems must be connected. Loss of hydraulic fluid from one system must be capable of being detected, and the defective system automatically isolated, so the other system or systems remain fully operational.)

(3) Steering gear other than hydraulic must meet equivalent standards to the satisfaction of the Commanding Officer, Marine Safety Center.

(d) On each tank vessel of 10,000 gross tons or over, but less than 100,000 deadweight tons, the main steering gear need not comply with paragraph (c) of this section if the rudder actuator or actuators installed are non-duplicated hydraulic and if—

(1) The actuators comply with § 58.25–60; and

(2) In case of loss of steering capability due to a single failure either of any part of the piping systems or in one of the power units, steering capability can be regained in not more than 45 seconds.

(e) On each tank vessel of less than 70,000 deadweight tons, constructed before, and with a steering-gear installation before, September 1, 1986, and on an international voyage, the steering gear not complying with paragraph (c) (1), (2), or (3) of this section, as applicable, may continue in service if the steering gear has a proved record of reliability and is in good repair.

(f) Each tank vessel of 10,000 gross tons or over, constructed before, and with a steering-gear installation before, September 1, 1984, must—

(1) Meet the applicable requirements in §§ 58.25–15, 58.25–20(c), 58.25–25 (a), (d), and (e), and 58.25–70 (e), (h), (i), and (j);

(2) Ensure working access to machinery and controls in the steering-gear compartment (which must include handrails and either gratings or other non-slip surfaces to ensure a safe work-

ing environment in case hydraulic fluid leaks);

(3) Have two separate and independent steering-gear control systems, each of which can be operated from the pilothouse; except that it need not have separate steering wheels or steering levers;

(4) Arrange each system required by paragraph (f)(3) of this section so that, if the one in operation fails, the other can be operated from the pilothouse immediately; and

(5) Supply each system required by paragraph (f)(3) of this section, if electric, with power by a circuit that is—

(i) Used for no other purpose; and either—

(ii) Connected in the steering-gear compartment to the circuit supplying power to the power unit or units operated by that system; or

(iii) Connected directly to the busbars supplying the circuit for its steering-gear power unit or units at a point on the switchboard adjacent to that supply.

(g) Each tank vessel of 40,000 gross tons or over, constructed before, and with a steering-gear installation before, September 1, 1984, and on an international voyage, must have the steering gear arranged so that, in case of a single failure of the piping or of one of the power units, either steering capability equivalent to that required of the auxiliary steering gear by § 58.25–10(c)(2) can be maintained or the rudder's movement can be limited so that steering capability can be speedily regained in less than 10 minutes. This arrangement must be achieved by—

(1) An independent means of restraining the rudder;

(2) Fast-acting valves that may be manually operated to isolate the actuator or actuators from the external hydraulic piping, together with a means of directly refilling the actuators by a fixed, independent, power-operated pump and piping; or

(3) An arrangement such that, if hydraulic-power actuating systems are connected, loss of hydraulic fluid from one system must be detected and the defective system isolated either automatically or from within the pilot-house so that the other system remains fully operational.

NOTE: The term "piping or * * * one of the power units" in paragraph (g) of this section refers to the pressure-containing components in hydraulic or electro-hydraulic steering gear. It does not include rudder actuators or hydraulic-control servo piping and pumps used to stroke the pump or valves of the power unit, unless their failure would result in failure of the unit or of the piping to the actuator.

Subpart 58.30—Fluid Power and Control Systems

§ 58.30-1 Scope.

(a) This subpart contains requirements for fluid power transmission and control systems and appurtenances. Except as otherwise provided for in this section, these requirements are applicable to the following fluid power and control systems:

- (1) Steering apparatus, main and auxiliary, including bow thruster systems.
- (2) Cargo hatch operating systems unless fitted with an alternate mechanical means of operation and approved by the Commandant as hydraulically or pneumatically fail-safe. A system is considered to be fail-safe if a component failure will result in a slow and controlled release of the loading so as not to endanger personnel.
- (3) Watertight door operating system.
- (4) Automatic propulsion boiler system.
- (5) Starting systems for internal combustion engines used for main propulsion, main or auxiliary power, as the prime mover for any required emergency apparatus, or as the source of propulsion power in ship maneuvering thruster systems.
- (6) Centralized control system of main propulsion and auxiliary machinery.
- (7) Lifeboat handling equipment.
- (8) Controllable pitch propeller system.
- (9) Installations used to remotely control components of piping systems listed in § 56.01-10(c)(1) of this subchapter.
- (10) All systems containing a pneumatic or hydropneumatic accumulator. In the case of hydropneumatic accumulators where it can be shown to the satisfaction of the Commandant that due to friction losses, constriction, or other design features, the hazard of explosive

rupture does not exist downstream of a certain point in the hydraulic system, the requirements of this subpart will apply only to the accumulator and the system upstream of this point.

(11) Materials and/or personnel handling equipment systems, i.e. cranes, hydraulic elevators, etc., not approved by the Commandant as fail-safe as defined in paragraph (a)(2) of this section.

(12) Any fluid power or control system installed in the cargo area of pump rooms on a tank vessel, or in spaces in which cargo is handled on a liquefied flammable gas carrier.

(13) All pneumatic power and control systems having a maximum allowable working pressure in excess of 150 pounds per square inch.

(14) Any other hydraulic or pneumatic system on board that, in the judgment of the Commandant, constitutes a hazard to the seaworthiness of the ship or the safety of personnel either in normal operation or in case of failure.

(b) Other fluid power and control systems do not have to comply with the detailed requirements of this subpart but must meet the requirements of § 58.30-50.

[CGFR 68-82, 33 FR 18878, Dec. 18, 1968, as amended by CGD 73-254, 40 FR 40168, Sept. 2, 1975]

§ 58.30-5 Design requirements.

(a) The requirements of part 56 are also applicable to piping and fittings in fluid power and control systems listed in § 58.30-1 of this part, except as modified herein. The designer should consider the additional pressure due to hydraulic shock and should also consider the rate of pressure rise caused by hydraulic shock.

(b) The system shall be so designed that proper functioning of any unit shall not be affected by the back pressure in the system. The design shall be such that malfunctioning of any unit in the system will not render any other connected or emergency system inoperative because of back pressure.

(c) Pneumatic systems with a maximum allowable working pressure in excess of 150 pounds per square inch shall be designed with a surge tank or other acceptable means of pulsation dampening.